CLAIMS

I claim:

1. An achromatic circular polarizer comprising:

a linear polarizer;

a 1/2 wave plate for a selected wavelength of light, the 1/2 wave plate in light receiving relation to the linear polarizer;

a partial polarizer in light receiving relation to the 1/2 wave plate; and

a 1/4 wave plate for the selected wavelength of light, the 1/4 wave plate in light receiving relation to the partial polarizer, wherein the linear polarizer, the 1/2 wave plate, the partial polarizer, and the 1/4 wave plate are arranged so that a plurality of light frequencies passing through the linear polarizer, the 1/2 wave plate, the partial polarizer, and the 1/4 wave plate, are each emitted as circularly polarized light.

2. The achromatic circular polarizer of claim 1 wherein the selected wavelength of light is chosen to occupy a middle position within the plurality of light frequencies.

3. The achromatic circular polarizer of claim 1 wherein the 1/2 wave plate comprises two superimposed 1/4 wave plates.

4. The achromatic circular polarizer of claim 1 wherein the 1/4 wave plate comprises a first retarder plate arranged with respect to a second retarder plate so as to form the 1/4 wave plate.

5. The achromatic circular polarizer of claim 1 wherein the partial polarizer comprises a plurality of glass plates, forming a plurality of air glass interfaces which are inclined with respect to a direction defined by a light path between the 1/2 wave plate and the 1/4 wave plate.

6. The achromatic circular polarizer of claim 5 wherein the linear polarizer, the 1/2 wave plate, and the 1/4 wave plate are arranged along an optical axis, and further comprising at least a first set and a second set of glass plates, the first set making a first angle with respect to the optical axis, and defining a first series of planes, and the second set of glass plates being arranged to lie in planes which intersect the first series of the planes at 90 degrees.

7. The achromatic circular polarizer of claim 5 wherein the linear polarizer, the 1/2 wave plate, and the 1/4 wave plate are arranged along an optical axis, and wherein the glass plates make an angle with the optical axis of between about 45 and about 55 degrees.

8. The achromatic circular polarizer of claim 1 wherein the selected wavelength of light is green light.

9. The achromatic circular polarizer of claim 1 wherein the selected wavelength of light is in the infrared.

10. The achromatic circular polarizer of claim 1 wherein the selected wavelength of light is in the ultraviolet.

11. A method of circularly polarizing a polychromatic beam of light comprising the steps of:

passing a polychromatic beam of light, composed of a plurality of wavelengths, through a first optical element, followed by a second optical element, followed by a third optical element, followed by a fourth optical element, the second optical element receiving the polychromatic beam of light from the first optical element, the third optical element receiving the polychromatic beam of light of the second optical element, and the fourth optical element receiving the polychromatic beam of light from the third optical element;

wherein the first optical element polarizes the polychromatic beam, and the fourth optical element circularly polarizes the polychromatic beam, and the second optical element introduces a first wavelength-dependent error, for each wavelength of light in the polychromatic beam, which is twice as great, and of opposite sign as a second wavelength dependent error, which the fourth optical element produces for each frequency of light in the polychromatic beam, when combined only with the first optical element, the third optical element attenuating every nonzero wavelength dependent error in the polychromatic beam received from the second optical element by one-half, so that each wavelength, of the polychromatic beam of light is circularly polarized after passing through the fourth optical element.

12. The method of claim 11 wherein the polychromatic beam includes light of infrared frequencies.

13. The method of claim 11 wherein the polychromatic beam includes light of ultraviolet frequencies

14. The method of claim 11 where the first optical element is a plane polarizer, the second optical element is a 1/2 wave plate in reference to a selected wavelength of light, the third optical element is a series of inclined glass plates, and the fourth optical elements is a 1/4 wave plate in reference to the selected wavelength of light.

15. An achromatic circular polarizer comprising:

a linear polarizer defining a direction of polarization, and an optical axis perpendicular to the direction of polarization;

a ½ wave plate, defined with respect to a selected wavelength, the ½ wave plate defining a fast optical axis and a slow optical axis, the ½ wave plate positioned perpendicular to the optical axis, and downstream from and in light receiving relation to the linear polarizer, the fast optical axis and the slow optical axis of the ½ wave plate being rotated 45 degrees in a first direction with respect to the direction of polarization;

a means for partial polarization positioned along the optical axis downstream of and in light receiving relation to the ½ wave plate; and

a 1/4 wave plate, defined with respect to the selected wavelength, defining a fast optical axis and a slow optical axis, the 1/4 wave plate positioned perpendicular to the optical axis downstream from and in light receiving relation to the means for partial polarization, the fast optical axis and the slow optical axis of the 1/4 wave plate being rotated with respect to the direction of polarization 45 degrees in a second direction opposite the first direction, so that light of varying wavelengths are circularly polarized by passage through the linear polarizer, the ½ wave plate, the means for partial polarization, and the 1/4 wave plate.

16. The achromatic circular polarizer of claim 15 wherein the ½ wave plate comprises two superimposed 1/4 wave plates.

17. The achromatic circular polarizer of claim 15 wherein the 1/4 wave plate comprises a first retarder plate, arranged with respect to a second retarder plate so as to form the 1/4 wave plate.

18. The achromatic circular polarizer of claim 15 wherein the partial polarizer comprises a plurality of glass plates, forming a plurality of air glass interfaces which are inclined with respect to a direction defined by a light path between the ½ wave plate, and the 1/4 wave plate.

19. The achromatic circular polarizer of claim 18 wherein the linear polarizer, the ½ wave plate, and the 1/4 wave plate are arranged along the optical axis, and wherein the glass plates make an angle with the optical axis of between about 45 and about 55 degrees.

20. The achromatic circular polarizer of claim 15 wherein the selected wavelength of light is in the visible.

21. The achromatic circular polarizer of claim 15 wherein the selected wavelength of light is in the infrared..

22. The achromatic circular polarizer of claim 15 wherein the selected wavelength of light is in the ultraviolet.